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Sericultural Development In China



Sericultural Development In China

THE SILK ASSOCIATION OF AMERICA
INCORPORATED

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FOREWORD

INTEREST of the American silk industry in the development of raw silk markets throughout the world—in the improvement of the quality and in the increase in the quantity of raw silk produced—dates back to the early years of our association's history. Frequent communications passed between the producing countries and the Association on the general aspects of silk improvement. Good will visits to silk centers were made by American silk manufacturers. As early as 1902 definite steps were taken by the Association to bring about an improvement of raw silk by the recommendation, translated into Italian, French, Japanese and Chinese, that the standard American skein be adopted by all silk producing countries. A visit to the Far East was made in 1917 by Mr. D. E. Douty, manager of the United States Testing Company, Inc., as personal representative of the Association. Mr. Douty traveled many miles through the silk districts investigating production methods and explaining the type of silk necessary for American looms.

The following years saw the inauguration of the present program of sericultural promotion under the auspices of the Silk Association of America, Inc., with special funds contributed by association members. One of our early sericultural experiments carried on in the Far East was at Canton Christian College in China, now known as Lingnan University. Special silk laboratory buildings were erected at this university where young men and women were trained in scientific silkworm production. The work spread through Nanking, Fukien and Shanghai, each of these places becoming a center of sericultural education through the financial assistance of the sericultural fund.

Reports which follow tell in detail the latest accomplishments of the association's sericultural work in China carried on through the Shanghai Testing House and the sericultural activities of other agencies who have had faith in the possibility of developing the Chinese raw silk market. They show that the work of raw silk improvement has gone on steadily despite the military and political situation, that the Chinese are manifesting a marked increase in interest and in willingness to assume responsibility, that the attempt to improve the quality and increase the quantity of raw silk has the support of the Nationalist Government, which is carrying on a constructive sericultural demonstration program, and that the colleges and schools of China are training young men and women in scientific silkworm culture.

Experiments which have been carried on in sericulture are hailed by those interested in such projects as one of the most constructive movements ever sponsored by business men. It is a tribute to the far-sightedness of the men engaged in the silk industry in this country that this work has been undertaken. It has resulted in the co-operation of silk men of the producing countries, both morally and financially, and in the education of young men and women in methods of producing silk suitable for the American market.

That this work may continue is the earnest wish of those who have given their efforts to it throughout this eight year period, during which more than \$300,000 has been collected and distributed. Much remains to be done, and for that purpose a new fund has been started toward which approximately \$80,000 has been collected. If American silk manufacturers are to broaden their available sources of supply of raw material, financial support must be given to the sericultural work now being done. The work, it is hoped, will continue with adequate funds.

RAMSAY PEUGNET,

Secretary

SHANGHAI INTERNATIONAL TESTING HOUSE

ANNUAL REPORT FOR THE YEAR 1927

Introduction In reviewing the activities of the Shanghai International Testing House during the year 1927, it is true that the period under review, as pertaining to the conduct of any kind of business or residence in China, has been fraught with discouraging circumstances. Political unrest, different kinds of high taxation, banditry, high cost of living and anti-foreignism have contributed to the development of a very complicated situation for both Chinese and foreigners. But as it was, and curiously too, the Shanghai Testing House and the movement in the Provinces toward a higher economic standard in the sericulture and filature industries, almost throughout the whole year, gathered fresh impulse. The year in this respect, therefore, can be said to have been satisfactory with outstanding achievements, as indicated by the Chinese silk men's willingness to contribute M. \$10,000 toward the operating deficit of the Testing House, the one hundred and three per cent increase in the volume of testing as compared to the previous year's business, the willing assent by Chinese and foreign silk firms to meet our increased testing fees, an evident and growing demand among sericulture farmers in certain areas for disease-free silkworm eggs, a new enthusiasm, and almost competition, among reelers to secure disease-free cocoons for their filatures and a restricted but satisfactory steam filature expansion in the Tsatlee district of Chekiang Province. When such progress has been made in the face of obstacles which arose during the year, it is very encouraging and certainly augurs well for the future.

Chinese Financial Cooperation In the summer of 1926 request was made to the Silk and Cocoon Guild for contributions toward the operating deficit of the Testing House for the year 1927. At that time the officers of the Guild, who were advocates for the continuation of the Testing House, privately guaranteed the payment of M. \$10,000 but did not attempt to open the subject formally with the Guild membership until the summer of 1927. Their appeal then met with success and the joint decision of the members, we feel, speaks well for the growing faith which they must possess in the future utility of the Testing House and, more so, if we pause to consider that not infrequently the neutral position of the Shanghai Testing House

renders testing results upon silk diametrically opposed to the producers who have been taxed to provide a fund for the continuation of the house. The psychology of the Chinese business man under such circumstances is usually very stubborn and we are only referring to this point to show again that there must be considerable underlying desire to continue the Testing House. The M. \$10,000 was paid by the Guild in total by October first after the money had been collected from the filatures by proportioning it according to the number of reeling basins operated. Subsequent financial support from the Chinese should be forthcoming with less persuasion upon our part now that the precedent of financial cooperation has been established, but we are inclined to think the Guild will wish to define the situation as it arises annually.

It has been the intention of the Testing House, since **Testing** it opened in China, to initiate the native silk merchants into the realm of raw silk testing with the idea of contributing something constructive toward the improvement and standardization of raw silk. Several attempts have been made during recent years to establish a scheme with the filatures for securing regular and continuous testing upon representative lots of silk, but each time, after prolonged experiment, sufficient success was not attained, we felt, to warrant the continuation of such services. However, at the beginning of the 1927 silk season, the Testing House concluded an agreement with a local Chinese silk export company and a general understanding with another Chinese exporter, in which a group of filatures is involved to undertake the complete testing of their silk exports. The plan of testing developed after several months trial proved such a satisfactory innovation to all concerned, that unanimous approval was expressed for its continuation in the future. New channels of contact with the filature operators were therefore opened and the opportunities for some constructive work, as pointing towards filature control and management, materialized. The Testing House within a brief period dispelled much misconception and unfounded prejudice among the Chinese concerning the so termed severity of its tests. Apparently the tendency, hereafter, will be to examine the institution with more vision and intelligent interest. Several projects of a similar nature are being promulgated by one or two other progressive silk merchants and it is very probable a further enlargement of similar business may develop in the future.

The combined volume of testing for the two years 1925 and 1926 was 11,658 tests. For the year 1927 the total tests were 12,283, with the added advantage of showing a wider distribution for all kinds of tests. There has been no decline in testing for the foreign silk exporters and business with the Chinese has shown an appreciable increase.

During the year a silk inspection room with accessories was installed for the examination of evenness and cleanness, as based upon the Silk Association methods and standards. A certain percentage of every lot of silk tested for the Chinese exporters and filatures has passed this inspection and composite records of the results have been systematically tabulated for future reference. The room further served as a model for other silk firms in Shanghai who installed similar facilities. After the receipt of the printed copy in English of the "Second Raw Silk Classification Report," it was completely translated into the Chinese language and circulated among the reelers.

The more progressive reelers, usually producers of the higher grade chops, have periodically shown an inclination to test their silks for the purpose of comparison with the Silk Classification report and not infrequently the Testing House has been called upon to render an interpretation of the report. Criticisms and comments, of course, have been expressed, but it is encouraging to observe Chinese reelers taking an interest in the standardization of their raw silk grades. During the latter part of the year not a few reelers took exception to the liberties taken by the foreign exporters in using the evenness of the Raw Silk Classification as a basis upon which to justify rejection of cargo, but reputed reelers of high grade chops resented the rejection of cargo as based upon the first grades of the classification since it is seldom that premier silks in the Shanghai market exceed 82% evenness.

The outstanding test increasing in popularity has been the conditioning test and if it is not too presumptuous to conclude from the year's statistics and the inquiries directed to the Testing House concerning it, we are inclined to prophesy a gradual increase in the volume of conditioning tests each year. Within the year the conditioning oven facilities were increased to meet the growing demands for this test and several other pieces of minor testing equipment were added to facilitate testing with despatch.

During September, 2235 tests of all kinds were completed, this representing the record month's business for the Shanghai House since it opened. The capacity of the laboratory is about 3600 tests per month, but it is doubtful if such

a number could ever be handled during a single month, as the laboratory space would be overcrowded with the number of native employees required to facilitate the handling of such an amount of testing. Should business during 1928 increase in any proportion to this year's business, undoubtedly it would become necessary in the not distant future to consider the expansion of the plant into adjacent quarters. The size of the silk vault has already caused inconvenience and only by a very carefully worked out plan with our clients were we able to keep silk moving during rush periods.

Increase of Testing Fees On October first, after consultation with our Chinese and foreign clients, it was decided to double the testing fees for the conditioning and net weight tests. As these two tests represented forty per cent of our monthly business, it was thought that their revision would add favorably to the monthly income and, as an entering wedge, would not create among our patrons any opposition which otherwise might have developed had every fee been doubled at the outset. No objection was expressed by the clients concerning the revision and since that date each one has paid the additional charges for these tests. If the volume of testing business can be increased and the remaining testing fees doubled at the beginning of the next silk season, it would seem that we stand a fair chance of greatly reducing the operating deficit of the house for the year 1928.

Finances In January an estimated budget of G.\$21,000 for maintenance expenses and G.\$9,200 estimated income was adopted for the year 1927. Several extensive alterations, additional equipment and increased labor and commodity costs during 1927 caused the estimated budget to be exceeded, but the year closed not unfavorably with total maintenance expenses amounting to G.\$23,190. Owing to the year's larger volume of testing and the increased fees, the income for the period amounts to G.\$11,835 or G.\$2,635 more than anticipated. The operating deficit was therefore G.\$11,358, or less than the estimated figure for 1927. These figures are given as based upon an exchange of two Mexican dollars for one gold dollar, but throughout the year, the conversion of gold into Mexican was about fifteen cents more favorable on the dollar and, therefore, the total gold operating figure for the year is actually less than the above quoted figure.

Testing Course The annual testing course was conducted during the period of February twenty-first to March twelfth, several weeks following the Chinese New Year, so as to allow the students sufficient time to reach Shanghai after the holidays. Previous to the opening date, twenty-one students had enrolled but, owing to military activities in Chekiang and Kiangsu Provinces, several were prevented from attending. Sixteen paid the tuition fee and fifteen completed the schedule of studies. Inasmuch as our testing course does not include several subjects covered in the course as it is given in New York, the period of instruction was completed in three weeks. This year's group was fairly representative of the sericulture and filature industries, but several students did not prove as capable as others who had enrolled in previous years. Our foreign trained Chinese assistant devoted his time for three weeks to the instruction in Chinese and, except for our occasional assistance in lectures or guidance during the course, he assumed major responsibility for the instruction throughout the period. When each student had finished the examination successfully, he was given a written statement in Chinese and English indicating the completion of the testing course.

Trips During the year, several trips were made into the silk districts of Chekiang and Kiangsu Provinces by our Chinese representative for observation and investigation of different phases of the silk industry. It has been the custom in previous years for the foreign staff to visit the important centers at least once each year, but, owing to the hostile feeling towards non-Chinese during the time scheduled for trips, all travel was postponed. However, by outlining with our representative the investigation work to be undertaken, it was possible, through him, to obtain the information desired and indirectly continue the contact developed in previous years with the Chinese silk men in various localities. Adequate accounts of the trips undertaken were prepared for New York, so it is unnecessary to reiterate here what has already been explained elsewhere.

To record in a report the real effect of a visit into the Tsatlee district does not permit of a statement combining all the encouraging visible signs which point towards a future expansion of steam filature reeling. The movement, of necessity, is restricted at present but, as experience is accumulated by the native silk merchants and existing laws pertaining to cocoon hongs modified, the Tsatlee reeling reformation will undoubtedly develop with accelerated rapidity. The effect of the change from the old to the new method of reeling is already being felt by the Tsatlee merchants

even at this early date and, as some have pointed out, it is one of the contributing causes for a decline in the amount of native Tsatlee re-reels during the last silk season.

Another trip was made by our Chinese representative into the Wusih district in the dual capacity of investigator for the Testing House and for the International Committee. Ostensibly the visit was made at our instigation to report upon the expenditure of funds in the demonstration rearing stations but, inasmuch as the visit included an investigation of the stations in general, the salary and expenses of our personal investigator were paid by the committee. A report of the trip was sent to New York during the year, but we can add here a few additional remarks not made at that time.

As a result of the very extensive sericulture demonstration program conducted last spring in the Wusih district of Kiangsu Province under the joint auspices of the International Committee and a group of leading filatures, disease-free eggs scored a big hit in that very important district. The sericulture farmers found the worms easily reared and obtained cocoons of superior characteristics for which they were paid an attractive market price. For the first time in Central China, raw silk was reeled in filatures from disease-free cocoons and, we understand, small quantities have been sold in the American and European markets. An interesting fact indicating their superior value is the silk content as was shown by a ratio of 4.5 piculs of dry cocoons to a picul of raw silk as compared to 6.0 and 7.0 for native cocoons.

With respect to the amount of disease-free eggs hatched this year by the sericulture farmers, the work is yet in its infancy. The total production of disease-free cocoons this season in the Wusih district alone was less than ten per cent of the total cocoon production in that district. However, the reelers have been converted to the value of high grade cocoons and each, individually, is taking action to influence a larger production in their respective cocoon buying districts.

Staff During the early part of the year the executive staff of the Testing House was deprived of two valued and experienced men, one American and one Chinese. Both had been connected with the Testing House for more than three years and it can be said that any success attained this year is in part a culmination of circumstances to which each contributed during his connection with the Testing House. Our Chinese executive resigned to accept an important position

as director of the Kiangsu Government Sericulture Bureau under the Nationalist Ministry of Agriculture and Commerce. His fitness for the position was in a large measure due to the training and inspiration for silk improvement work received while with the Testing House and consequently he was considered by silk men to be an outstanding man especially qualified for the position.

To meet the additional volume of testing during the last half of the year the staff was increased and at the time of writing this review consisted of two Americans, two British, one Roumanian, four Russians and thirty-two Chinese. Intimidation of native help by agitators following the ascendancy of the Nationalists in Shanghai was so possible in any foreign business that it seemed wise to intermingle the native staff with foreigners. With the present native and foreign trained staff well drilled in the routine of testing, it will probably be able to cope for some time to come, with any demands made upon the Testing House for handling an amount of business commensurate with present equipment and quarters. Services of local foreign men of sufficient ability are generally available as adjuncts at a remuneration considerably under the cost of men from abroad and they sometimes possess the advantage of speaking Chinese and knowing local conditions and customs.

Yield Tests Continuing the annual cocoon study commenced in the spring of 1925 upon native cocoons of Central China, we again, in the spring of 1927, repeated similar investigations upon native cocoons, expanded the study to include an identical investigation of disease-free cocoons produced in the same districts, and supplemented the research with tests upon representative lots of cocoons secured from the four producing districts of Japan. Both Chinese and foreign silk men have come to depend upon the Testing House to provide annually such information. It has been translated into Chinese for use in lectures and sericulture courses in several universities and is considered valuable data for use as propaganda in the movement for popularizing disease-free eggs. The additional data upon the characteristics of Japanese cocoons clearly brought out the wide difference in values between cocoons produced under scientific sericulture methods in Japan and those produced by the unscientific practices of the Chinese farmers. The study throughout confirmed the value of high grade cocoons in producing raw silk, not only because of the larger yield of superior fiber and cheaper production costs, but also their higher economic value to the sericulture farmer and filaturists.

**International
Committee for
Improvement of
Sericulture in China**

Concerning the work of your representative upon this committee, adequate reference has already been made to the International Committee in a report prepared for the Shanghai American Chamber of Commerce last summer. Since writing that review greater evidence of the progress being made in the movement for popularizing disease-free eggs has been apparent and it seems almost assured that this important economic silk movement will advance without interruption.

One of the outstanding points initiated for the committee during 1927 was the introduction of budget control over income and expenditures. In January of 1927 when your representative became officially identified with the committee's work he considered the finances to be in very bad condition. The impression was gathered that no one was particularly concerned about the committee's indebtedness as nothing was being done to reduce its outstanding obligations and added financial responsibilities were multiplying each succeeding month. A total of M. \$122,856 indebtedness was being carried on the books at that time, extending as far back as 1925. From a mercantile point of view such an adverse situation might have been unavoidable during lean periods of business depression, but we insisted that such a state of affairs in the International Committee was unwarranted, especially since a generous subsidy from the Customs had been received regularly for years without default and the income for the work was a fixed amount. It was most evident that the affairs of the organization were being mismanaged and we, therefore, quietly but persistently set about to introduce needed changes. By the close of the year, due to better financial control, the committee had succeeded in reducing its liabilities to M. \$55,000 with favorable prospects of cleaning the financial docket in another half year.

For eight years no record of egg distribution or income received from their sale had been kept in a bona fide manner and, as a second step towards holding the committee to account for the budget adopted in January, your representative, with the approval of the chairman, took charge of the egg stocks, put them into refrigeration from where they could only be withdrawn against his signature, opened a record of their sale in Chinese and English and properly recorded in the accounts the sums due. The result, of course, is obvious; distribution was known and income secured and properly recorded. By the close of the year income and expenditures covering all items had been accounted for in the regular records and an official audit of the accounts was prepared by certified American accountants.

Throughout the year each member of the executive committee received monthly an official statement of the finances which not infrequently guided the individual members in their discussion of the organization's affairs when regular business meetings were held. A total of fifteen regular meetings were attended within the year and numerous visits made by your representative with the various members for the purpose of discussing problems confronting the organization. In August it was decided that all future meetings of the committee would be held in the Testing House where, since that date, the working committee has gathered on several occasions.

Your representative also urged the desirability of engaging a qualified Chinese business administrator for assuming complete responsibility of the organization's affairs but the idea, at the start, did not quite catch the fancy of the Chinese; so for the time being the proposal is being held in abeyance.

Your representative was also influential in persuading the committee to consider one or two other disagreeable problems hampering its progress with the result that a very intriguing non-foreign member of the working committee was asked to resign. The Chinese members, too, have not been lacking in their enthusiasm for introducing reforms and during the closing months of the year several changes suggested by the government about personnel of the staff were considered and a movement was being advanced for a thorough re-organization of the Chinese representatives on the General Committee.

A new type of cooperation developed during the year when several progressive reelers, for the purpose of securing the total production of eggs at the Chinkiang station, jointly assumed complete responsibility for paying its operating expenses. Another native silk man, having been converted to the wisdom of utilizing disease-free eggs in his cocoon hong districts, presented the committee with a refrigeration plant costing M.\$15,000. With this added facility installed at the Chinkiang Station, it was possible during August of this year to rear the first autumn crop of eggs ever hatched in Central China.

Your representative has continued the agitation for erecting an egg producing station in the important egg producing district of Yuhang in Chekiang Province. The question has been given serious consideration by the executive committee. In fact, a decision has been made to go forward with that project as soon as finances permit. It is very possible that the Chekiang Provincial Government can be in-

duced to allocate, for the committee's use, a large plot of land in that district as a site for the new station. Approval concerning the proposal has already been expressed by the government and negotiations are now pending between us concerning some kind of an arrangement. The erection of a station will probably not be undertaken until the late fall of 1928, but the planting of mulberry seedlings can be commenced as soon as the government grants the required land.

It has continued to be possible for your representative to devote part of his time to administration and direction of the committee's program and the executive committee has been unanimous in its desire for him to assume a large share of the responsibilities of the position. There are numerous interesting matters about the work which cannot be recorded here, but their accumulated importance has had a place in bringing about an improved state of affairs, probably better than any time since the committee's inception. Beginning in September your representative was further requested to fill temporarily the position of secretary.

SYNOPSIS FOR 1928

Financial Cooperation By Chinese Guild 1928

Though no request has been made to the Guild, we are almost confident that a promise to contribute M.\$10,000 for 1928 can be secured, if the situation is defined sometime about the opening of the new silk season.

The responsibility for this assumption in the absence of any definite assurance from the Guild will, of course, have to rest upon us. For several reasons, it has been considered wise not to open the subject with the Chinese until some time next year.

Revision of Testing Fees 1928

It is proposed, on June first of next year, to double the testing fees for all tests except the conditioning and net weight which were revised on October first of last year. We do not anticipate any opposition concerning the increase; in fact, the majority of our clients will undoubtedly be prepared for the change as intimation has already been given regarding such intentions.

Volume of Testing Business 1928

Provided the Shanghai raw silk market does not decline to an unprecedented level and the testing for the Chinese filatures and exporters continues as favorable as the last half of 1927, it is estimated the volume of business for 1928 should approximate fifteen to eighteen thousand tests. Upon this basis, with increased testing fees after June first and a probable grant from the Guild, the financial deficit for maintaining the house during 1928 should be considerably less than for the year 1927.

R. E. BUCHANAN, Far Eastern Manager
Shanghai International Testing House,
Shanghai, China

December 10, 1927.

SERICULTURE WORK FOR 1927
THROUGHOUT CHINA

IN response to our request for information about silk improvement work in various sections of China, the Kwongtung Provincial Bureau of Sericulture, Fukien Christian University, The University of Nanking, Chefoo Silk Improvement Commission and Kiangsu Provincial Bureau of Sericulture provided data concerning their respective activities for the year 1927.

For informative reasons we maintain intimate contact with each of these individual programs. As little opportunity is afforded us, during the course of a year, to present the many phases of improvement and expansion work as observed or examined by us, we decided to include the following references with our annual report for 1927.

Their combined detail makes rather long reading but, for self instruction and a comprehensive understanding of the facts pertaining to the significance of the various movements towards a higher economic standard in the silk industry throughout China, the information has its value.

R. E. BUCHANAN, Far Eastern Manager
Shanghai International Testing House,

November, 1927.

Shanghai, China

NATIONALIST PROGRAM FOR THE IMPROVEMENT OF THE SILK INDUSTRY IN CENTRAL CHINA

The importance of improving China's silk industry was recognized by the Nationalist Government long years before its influence reached the Yangtze Valley. In July, 1923, Mr. Liao Chung Hoi, the assassinated leader of the Kuomintang Party, at that time Civil Governor of Kwongtung, contributed to the Department of Sericulture of Lingnan University five thousand dollars with which to conduct a survey of the silk industry of that province. Soon after the completion of the survey, a Provincial Bureau for the Improvement of Sericulture was created. The late Mr. C. W. Howard, an American who accomplished a great deal in improving sericulture in South China, was invited to be the director of the bureau which has since been carrying on excellent work.

When the Nationalist movement spread out to this section of the country, we found that the same keen interest was shown towards silk improvement by the establishment of a similar bureau in Kiangsu under the Department of Agriculture, Engineering and Industrial Developments. The function of the bureau is to formulate and execute a plan that will help most effectively in the expansion of the silk industry of the province. The plan consists of a revision of government regulations, establishing of experiment stations and demonstration work among the farmers, with the sole aim of increasing China's raw silk production in order to meet the demand of American and European silk manufacturers. Chekiang Province, following the example, has also created a sericultural division in the Agriculture Development Bureau for the same purpose.

Abolishing Restriction on Cocoon Hong's

The first move to expand the silk industry in Central China was to open up the vast sericultural potentialities of the area by abolishing government restriction on cocoon hong's. The former administration, for the purpose of protecting the home silk weavers from unemployment due to lack of raw materials for their looms, passed a law in 1913 prohibiting further additions of cocoon buying stations in the interior. Its direct result was the forced stagnancy in filature silk exports in the last decades as shown by the customs statistics. The Nationalist authorities thought it unwise to protect a minor industry at the expense of China's most important product of export. Therefore, a proclamation

was issued allowing free opening of cocoon hong's in any section of Central China, including the so-called "silk districts" where the establishment of cocoon hong's was formerly forbidden. Now the rich sericultural regions west of the Tai Ho Lake and the famous "Tsatlee district" south of it are all available for the exploitation of purchasing agents from the steam filatures and cocoon merchants.

Encouragement of Disease-Free Egg Production The main effort of increasing silk production, however, is directed towards the elimination of silkworm disease through the use of improved eggs and improved methods of rearing. It is stated by prominent sericulturalists, whose judgment cannot be questioned, that the percentage of disease in native silkworm eggs ranges from seventy to eighty per cent, which is the chief cause of poor cocoon harvest and by the elimination of which, China's silk production can be increased fourfold, without increasing the present production of mulberry leaves. For the past years, different organizations in the two provinces distributed examined eggs to the farmers. Though their universal adoption is only gradual, the result in the last two years has been very encouraging. Many farmers and filature men have realized the value and usefulness of disease-free eggs. The policy of the government therefore is to encourage production and to give whatever help possible to enlarge its quantity. In Kiangsu Province a modern egg industry is rapidly growing under the able guidance of the Hushukwan Girls' Sericultural School. There were fifteen companies making more than one hundred and fifty thousand sheets or more than four million layings last spring. They are located along the Shanghai Nanking Railway as follows:

Name of City	No. of Stations	Sheets Produced
Hushukwan -----	2	40,624
Soochow -----	2	25,990
Kwanshan -----	1	23,400
Wusih -----	2	18,633
Wukong -----	1	17,000
Chinkiang -----	3	8,759
Changchow -----	2	8,459
Nanking -----	1	6,073
Sunkiang -----	1	4,000
Total -----	15	152,938

The government is assisting these egg producers in two different ways. First, in cooperation with the Hushukwan School, it plans to produce carefully bred parental stock

to be distributed to them gratis. Second, it plans to install a series of demonstration stations in the sericultural districts to create additional markets for their product.

Demonstration Work The demonstration stations have been the bulwark of silk improvement in recent years. It is the most efficient method found so far in propagating new ideas among the mass of sericultural farmers living in the villages of the interior. The nature of the work is to teach peasants in the neighborhood of the stations new methods of silkworm rearing, such as the use of healthy eggs, disinfection of the rearing house, scientific hatching and feeding of worms, and also helping them to market their improved cocoons. The idea was initiated in 1924 by the Extension Department of Hushukwan School at Tsingtsa where remarkable success was made. The farmers not only reaped a more abundant harvest, but also secured a higher selling price for their products. Formerly a farmer would be satisfied if twelve catties of cocoons were produced from one-tenth of an ounce of silkworm ants. The demonstration stations have shown them how to increase the yield to fifteen catties, sometimes even as high as twenty, and, to add to the bargain, the cocoons thus produced can be sold fifteen to twenty dollars per picul higher than the native ones. Thus the work soon spread to the Wusih district where it was carried out on a more extensive scale. Incidentally, this work is found to be a strong weapon in pushing the sale of disease-free eggs, the demand for which is now tremendously increased. However, it has been thus far limited only to Tsingtsa and Wusih. In order to create further markets the Kiangsu Provincial Bureau intends to establish ten stations in Changshow and Kiangyin next spring, and in Chekiang, twenty stations are to be installed in the vicinity of Hangchow.

The results of this proposed encouragement is that more sericulturists will be drawn into the egg business. Many new stations have already been organized. The production next year is roughly estimated at one-half million sheets, or fourteen million layings, the sum being double that of 1927. It is apportioned as follows:

Thirty private egg producers in Kiangsu	300,000 sheets
Ten private egg producers in Chekiang	50,000 "
International Committee for the Improvement of Sericulture	60,000 "
Nanking University	30,000 "
Yangchow Provincial Station	20,000 "
Sericultural Schools and others	40,000 "
Total	500,000 sheets

Experiment Stations The establishment of experiment stations is another outstanding feature. The main station of Chekiang Province is already organized, funds have been appropriated and construction is scheduled to begin next January. It is going to be located at Yuhang, the native egg producing center of this province. It will have ample mulberry plantations, adequate silkworm nurseries for breeding of worms and filature machinery for the reeling of raw silk. A similar project is under way in Kiangsu. Wusih has been chosen to be its site. In carrying on the experimental work, emphasis will be laid on acquiring, through selection and crossing, species of silkworms and types of mulberry trees most suitable to the soil and climate of Central China. Due consideration will be given to ease in planting and rearing so that farmers of average intelligence can utilize them. In the meantime the silk reeling department of the stations will bring to the filature men new Japanese and Italian inventions of filature machinery and equipment that can be easily adapted to the use of filatures in China. It will carry on experiments in methods of reeling that will ultimately reduce the cost of production and eliminate waste in filature operation. The result of the experiments will be widely distributed to the interested public.

The above mentioned are but a few of the more important points. The introduction of an autumn cocoon crop is a minor but interesting phase of the program. In Japan the production of autumn cocoons is as large as that of spring due to scientific production and storing of autumn egg sheets, while in Central China the autumn crop is comparatively insignificant and the mulberry leaves in autumn have not been taken advantage of. For the first time in this region, more than ten thousand cold storage autumn egg sheets were produced by the International Committee and the Hushukwan School last summer. They were distributed in September at Wusih. Reports of this first trial show bright prospects for the undertaking. To encourage and facilitate the autumn egg sheet production, the government is going to build a public refrigeration plant at Wusih for the use of those who are interested in the enterprise.

The carrying out of this immediate silk improvement plan will result, it is expected, in a rapid expansion of the raw silk industry. The goal set by the government is that in five years raw silk exports will be doubled. This will not only bring more wealth to the people, but will also supply the needs of American and European silk manufacturers in their search for high grade raw silk.

Y. T. CHOW, Director
Kiangsu Provincial Bureau of Sericulture
November, 1927. Nanking, China

CHEFOO SILK IMPROVEMENT COMMISSION CHEFOO, (SHANTUNG PROVINCE) CHINA

The commission was started in 1920 for the purpose of improving all local silk products and with the idea of increasing trade and prosperity of the country in general. The committee, as organized in 1927, is composed of a chairman, who is the Superintendent of Customs, a vice chairman, treasurer, the Commissioner of Customs, two representatives of the Chefoo Silk Guild, two representatives of the Foreign Silk Association, one Chinese sericulture expert, and a foreign administrator. The commission is financed by funds remitted on the duty of silks exported and since its inception has received approximately Taels 400,000 for sole expenditure in advancing the aims of the organization.

1927 Egg Production During the year, 300,000 mulberry layings and 20,000 oak layings (tussah) were produced by the commission's staff, these amounts representing fifty per cent increased production over 1926. The supply of selected eggs has been gradually increased each subsequent year and for 1928 it is expected that the production can be doubled. These eggs have always been distributed free of charge to selected sericulture farmers, as it has been the responsibility of the commission to foster the interest and demand for their ultimate use and as a result the prospects are very favorable for disposing of them at a nominal price beginning in 1929. There are no local organized egg producers, so the farmers who are inclined towards the use of disease-free eggs have been obliged to make use of the commission's eggs.

Distribution of Acorns and Mulberry Seedlings In 1927 approximately 6,000 piculs of acorns were distributed among farmers without cost, to assist scrub oak planting in connection with oak silk culture. There are vast spaces of suitable but undeveloped land in Shantung for oak culture and, by developing the food for tussah worms, it eventually will mean the building up of a local industry. Within the past seven years the commission has influenced the planting of sufficient oak to increase the area in Shantung Province by 53,000 mows. As it takes seven years for an oak of the local variety to reach maturity, the first trees planted in 1920 were ready for utilization as food for the worms in 1927. Mulberry seedlings have also been distributed gratis and in a like manner the area of trees has steadily multiplied. For 1927 about 150,000 seedlings of the native Shantung variety were planted by farmers in the interior districts of the Province adjacent to the immediate Chefoo district.

**Demonstration
Work**

The commission maintains five sub-stations in the country districts where scientific rearing and instruction is practiced for the benefit of the farmers. Each station has a staff consisting of a sericulture assistant, who is in charge, two training students from the main experiment station in Chefoo, overseers and eight coolies. The advantage of this type of work is fully recognized by the silk interests and, as conditions and finances permit, this work will be expanded without limit.

**Chefoo Silk
College**

For a number of years a course of instruction in sericulture has been offered in which the students, apart from regular class instruction, are given practical work in mulberry and oak culture, worm rearing and raw silk reeling. Forty girl students were taking the course in 1927. About eighty students have finished the course since it was first offered by the commission, the majority of which have returned to their native places, probably to carry on diversified phases of the silk improvement work learned while a student. There is no record of any of the students going into commercial egg production work probably because sufficient impetus in the movement for selected eggs has not yet been gained.

**Silk
Reeling**

Twelve reeling basins of the Shanghai type (copied Italian makes) have been installed at the college and women are being trained how to reel mulberry cocoons. A limited amount of testing equipment is in use, principally for the examination of the physical qualities upon silk reeled.

The commission is glad to report that the confidence of the growers has been gained in many districts of which Chefoo is the port, a fresh and strong interest in the improvement of silk culture and the silk industry has been created, and the benefits derived by the use of selected eggs have been proved.

G. KRUPER,
Foreign Administrator,
Chefoo, China

November, 1927.

FUKIEN CHRISTIAN UNIVERSITY FOOCHOW, CHINA

In the sericultural work carried out at the Fukien Christian University for the past two years, the emphasis has been placed upon disease eradication, as no work in selection or cross-breeding could be done successfully until the stock was free of pebrine. This first step was necessitated by the loss during our furlough of a large part of the stock previously selected to be free from pebrine. As a result of the two years' work, a good supply of clean eggs is now at hand to begin the work in 1928.

The selection of disease-free eggs in this province is much needed. Random samples of moths, reared from cocoons bought in the market and tested in our laboratories, always show high infection with pebrine, quite often reaching nearly 100%. One group of four samples examined showed infection of 88.2%, 76.7%, 99.4%, and 96.4%, each, or an average of 90.2%; while a second group of five samples tested 23.7%, 82.4%, 69%, 24.8%, and 62.8%—an average of 52.54%. These samples were taken at random. For the years 1925 and 1926 the farmers about Foochow reported serious losses due to diseases amounting to almost 90% of the entire crop, as near as could be ascertained from questioning them whenever possible. Of course, no reliable data is obtainable. During the past season (1927) the situation has not been reported as serious, and hopes for a better season in 1928 are entertained by many, although pebrine is always present to a large extent.

Attempts to meet the situation by the use of eggs imported from North China and Europe have been unsuccessful. The farmers cannot now be prevailed upon to try them any more, and in our own work we have found that a very large per cent of the worms die of flacherie, due, doubtless, to the very high humidity and extreme warmth of our season at the time of rearing. With a modern well-built house, in which temperature and humidity can be properly controlled, this difficulty can doubtless be overcome. Also keeping monovoltine or bivoltine eggs, from North China, Japan or Europe, in cold storage through the summer and rearing the worms during September, when our climate is cooler, sunnier and drier, should be very effective. This will be thoroughly tested out in September of 1928. After all, however, the best method of solving the problem seems to be that of the improvement of the local and acclimated varieties, although it will be a slow and laborious task.

So far, no study of the mulberry cultivation has been made, but experiments have now been started, with a view toward the raising of mulberry trees on the hillsides. Wild trees are often found growing unattended on the hills and with proper care and attention, they would undoubtedly do much better. Then the best varieties of white mulberry could be grafted into such stocks, and a better quality of leaf produced. With the thousands of acres of unproductive hillsides in Fukien facing us on all sides, often bearing old terraces that are now unused but still fertile from former decades, or possibly, even centuries of cultivation, such an opportunity of obtaining an additional supply of leaves from land at present unused must not go untried and unchallenged.

During the progress of the work of the past two years some interesting figures of the effect of the pebrine disease have been obtained. In one experiment, out of four hundred and forty-eight moths examined only thirteen, or 2.91% were found to be free from pebrine. The diseased and disease-free worms from these moths were reared separately but under similar conditions with the result that the thirteen clean moths produced six hundred and sixty-eight cocoons while the infected four hundred and thirty-five moths did not produce a single cocoon. Out of a number of experiments only one or two can be referred to. In one case, twenty-seven layings of clean eggs produced fifty-five ounces of cocoons, while under precisely similar conditions, one hundred and twenty-nine layings from the same lot, but infected with pebrine, produced only sixty-eight ounces of cocoons, a loss of 74.1% as compared with the production of the disease-free eggs. From a study of the results of a number of such experiments, it was shown that, in this work at least, (and it is probably typical of the conditions prevailing on a larger scale) the worms infected with pebrine produced on an average only 31.6% as much silk as the ones free from the disease, indicating a loss of 68.4% in silk production due to the effects of pebrine in the province. These figures seem very high, but the reports from the silk farmers indicate frequent losses of one hundred per cent and in the village nearest to Foochow an apparent average during the past two years of ninety per cent. With most of the farmers the work of silkworm raising is a side line carried out in connection with the raising of rice, otherwise they would have to give up such unproductive work at once. This cleansing process may be a good thing in one way for it drives out the careless and inattentative workers and puts a premium upon careful and thorough application leaving in the industry only the best men.

The tremendous losses due to diseases, coupled with the excessive taxation of the successive governments and the depredations of bandits, make the lot of the silkworm farmer far from easy and the faithful ones remaining in the industry, in spite of its drawbacks, surely deserve all the aid that can be given them.

C. R. KELLOGG,
Professor of Zoology,
Foochow, China

November, 1927.

LINGNAN UNIVERSITY CANTON, (KWANTUNG PROVINCE) CHINA

The sericultural improvement work is now carried on jointly by the Kwongtung Provincial Bureau for the Improvement of Sericulture (under the Department of Industries) and the School of Silk Industry of Lingnan University (formerly Canton Christian College). Most of the research and experimental work, extension and inspection work is under the bureau and financed by the Kwongtung Nationalist Government, while the educational work is entirely in the hands of the school. Money from the China Foundation (controlling the American Boxer Indemnity Fund) is expended in research and experiments with silkworm diseases.

The School of Silk Industry has the following equipment, the largest portion of which was donated by the silk industry of the United States.

Buildings

Atwood Reeling Laboratory
Sericultural Building
Short Course Student's Dormitory
Egg Production Building
Staff Dormitory
Reeling Girls' Barrack

Equipment

Cold storage plant, capacity for several million egg sheets
Kelvinator for refrigerating experiments
Demonstration reeling room with 30 basins
Experimental reeling room with different types of reeling basins
Set of silk testing equipment
Cocoon drying experimental laboratory
Two well equipped pathological laboratories
Five to six thousand dollars worth of miscellaneous equipment

Staff

ADMINISTRATION

A director
An assistant director
Two secretaries
One accountant
Business administrator

RESEARCH

Pathology
Two technical experts
Two assistants

RAW SILK AND SILK TESTING

Two technical experts
One assistant
Two mechanics

BREEDING

Two technical experts
Two assistants

EGG PRODUCTION

Three assistants

MULBERRY BREEDING

One breeder

EXTENSION

Two persons

COUNTRY OFFICE

One person

Cocoon Improvement In a variety test on some sixty types of worms from different parts of the world, the points studied are their adaptability to Kwongtung climatic conditions, yield and quality. Most of them can rear only one or two crops a year. However, some are gradually being adapted to this environment and produce more crops. We are making line breeding on ten of the most suitable varieties and some few strains prove to be quite promising. Canton cocoons are a mixture of green and white and we are isolating the white strains which usually are weaker in comparison with the green strains, but selection of which has uncovered some strong strains. We are also trying various combinations of eggs to be distributed to the cocoon farmers.

Cold Storage of Eggs We stored only a few hundred egg sheets for the egg producers during the year, but this is becoming popular and we hope a great many more producers will have their eggs stored this season.

We also tried several cold storage experiments and found that hot water eggs (i. e. eggs after being artificially hatched by hot water) can be stored for the next crop if they cannot be sold during the preceding crop. At present, eggs cannot be kept over and either have to be sold at a very small sum or be thrown away in case of a dull market. The supply and demand of egg sheets can be adjusted, as in other countries, with this method. We have not yet obtained any definite results in the cold storage of white eggs.

Mulberry Production We have only a few varieties of mulberries in our testing plot but will have more next year. We are making selections of strains for thicker, smoother

and larger leaves with higher yield. Already over seventy individual varieties have been tested and found to have these qualities. Other experiments being conducted include the study of characteristics of the local mulberries and fertilizer tests.

Pathology Experiments on the elimination of pebrine by oxygen and on breeding disease-resistant strains are under way. Effort is being made to bring about a better adaptation of the Pasteur method of disease examination and much time is devoted to finding better methods of disease prevention. A systematic study of the four prevalent diseases is also being made.

Raw Silk Raw silk is being tested for filatures and quite successful experiments in the preparation of Canton waste by machinery are being tried. We are advocating this in the local filature and we shall have a few bales to send out for commercial use. In reeling, we are comparing the advantages and disadvantages of different reeling methods on Canton silk such as sunken and surface reeling, comparing the adding of cocoons by hand and by chop sticks, etc. We are also working on a new type of cocoon dryer that we hope will take the place of the present slow drying methods and also have started solving problems in the preparation of cocoons for reeling.

Extension We have a branch office in the silk district, directing and advising the worm farmers. The filatures are getting information through our branch office. A bi-monthly bulletin giving information on the industry is published and this is widely distributed among the silk people. We are organizing farmers' clubs to promote the improvement of and the raising of cocoons and good eggs distributed by us.

Education The School of Silk Industry is offering courses of college standards in two groups: the raw silk group and the sericultural group. The college also takes in apprentices in limited numbers and gives such short courses as are deemed necessary.

November, 1927.

P. K. FU, Director
Canton, China

THE UNIVERSITY OF NANKING NANKING, (KIANGSU PROVINCE) CHINA

1927 Egg Production Our 1927 production marked, for the third time, a production of more than a million layings of eggs. The exact number of layings was 1,072,495 as against 1,157,540 for 1926 and 1,124,400 for 1925. In view of the disturbed political and military conditions, this year's record is a much better one than either of the two previous years. There was a further increase in efficiency in production over previous years, the quality of the individual layings was higher, the percentage of disease was much smaller, running about four per cent as against eleven per cent for 1926 and sixteen per cent for 1925. In spite of the somewhat small gross production, the net production in salable layings of eggs will be greater than for 1926 or 1925.

1927 Egg Distribution The result of our spring distribution of eggs was uniformly excellent and recent trips into the localities where our eggs were used last year indicated a much greater demand for next year. Unfortunately, most of the 600,000 layings of eggs sold and delivered to the International Committee for the Improvement of Sericulture in China were not distributed by them and so two-thirds of the energy and labor which went into our 1926 production was absolutely lost. However, the results secured by the farmers from the balance of the eggs distributed under our direction were most gratifying and the reputation of our Golden Butterfly Chop has been very greatly enhanced.

Mulberry Production Our mulberry orchards produced about sixty per cent of the leaves which were used last spring. The old orchards as well as the new are in excellent condition and it is hoped that the total needs in mulberry leaves for our 1928 production can be met from our own orchards. This will not only react favorably in keeping down the occurrence of disease but also will help to reduce our cost of production.

Demonstration Centers The two demonstration silkworm rearing stations, the one near Kiangyin and the other near Wusih, in Kiangsu Province, will be continued next year. Already many more families have applied for cooperation than we shall be able to take care of. The sale of silkworm eggs in the localities in which the demonstration centers are situated will be many times greater than last year.

JOHN H. REISNER,
Foreign Director of Sericulture,
Shanghai, China

November, 1927.